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Texturiemaschine

Machine de texturation

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## Description

**[0001]** The present invention relates to a textile machine for the texturing of yarn by twisting thermoplastic deformation.

**[0002]** With this machine the yarn to be processed, consisting of so many parallel filaments, is deformed plastically so that the latter tangle and join one to the other.

**[0003]** To summarise, the texturing operation consists of heating the yarn filaments to soften them slightly and of subjecting them, in this "pasty" state, to twisting followed immediately by counter-twisting so as to cause permanent plastic deformation of the yarn filaments to allow tangling and binding of the filaments one with the other. This double operation of twisting and untwisting performed on the yarn is defined by those skilled in the art as "false twisting".

**[0004]** The known texturing machines of the type referred above are generally divided into a first type of machine having one single yarn heating oven for true and proper texturing, i.e. for subjecting said yarn to the abovementioned false twisting, intended to texture for example a material such as nylon, and machines of a second type, intended to texture for example a material such as polyester, which in addition to the first texturing oven have a second oven for stabilising the elastic properties of the yarn, that is to say for heating the yarn in order to eliminate its excessive elastic tensile deformability.

**[0005]** The machines of the first type essentially comprise a main support framework which defines a creel for supporting feed reels of the yarn to be processed and a support structure for the collection assemblies of the textured yarn, wherein the creel and the support structure of the yarn collection assemblies are arranged and distanced one from the other so as to define an intermediate transit corridor for staff in charge.

**[0006]** The texturing machine also comprises yarn texturing means which comprise essentially, in sequence: a part for drawing the yarn to be textured coming from the creel area, said texturing oven for heating the yarn to be textured, a channel for cooling the heated yarn which emerges from said texturing oven, a texturing spindle - that is to say a device suitable for causing the required twisting and untwisting of the yarn, and a part for drawing the textured yarn.

**[0007]** A machine of that first type is disclosed in EP-A-0281657 and comprises a part for drawing the yarn delivered from creel area, a heater and a texturing spindle sequentially disposed in the advancing direction of the yarn substantially on a straight line.

**[0008]** In known texturing machines the arrangement of the elements which make up the machine, that is to say the creel of the collection assemblies and texturing means, poses a problem from at least two different viewpoints.

**[0009]** According to a first point of view, texturing machines

are built in order to economise as far as possible on the space occupied by said machine, for example attempts are made to restrict to a maximum the width of the intermediate transit corridors. Moreover, from another viewpoint, the need has been felt to bring the parts for actual texturing into a position with immediate access for staff, both in order to perform operations of maintenance and replacement of parts, and to trigger the spinning operation, which requires the operator to force the passage of the yarn inside all the operative elements of the texturing machine. The latter operation in particular, the texturing machines provided being arranged adjacent in long rows which may also contain several hundreds of machines, requires several hours of work by the operator, so that the need has been felt, in order to make savings in labour terms, to have all the elements wherein the yarn has to be passed within reach, without said operator being forced to move continually from the intermediate corridor to the back of the machine or to have to remain in poorly accessible positions, raised or inside moving machinery which above all may create a dangerous situation for the safety of the same operator.

**[0010]** The texturing machines of the second type comprise, in addition to the abovementioned elements and in series with said texturing means, yarn stabilisation means aimed at fixing the length of the yarn, essentially comprising the abovementioned second heating oven and a part for drawing the yarn which comes out of said second oven.

**[0011]** In texturing machines known to date said texturing means are arranged in a higher position in relation to the creel and to the textured yarn collection assembly, in a position with poor access for staff. They also extend from the creel to the yarn collection assembly in such a way as to force, due to their considerable development lengthwise, the yarn collection assembly and said creel to be maintained excessively apart one from the other.

**[0012]** Moreover in known machines of that second type, like those disclosed in EP-A-0419815, the second oven for fixing the yarn is generally arranged vertically and in a closed station provided on the back of the collection assembly such as to make said yarn fixing oven poorly accessible to staff. Said known machines therefore have excessive overall dimensions and an awkward and dangerous arrangement of the yarn stabilisation and texturing elements.

**[0013]** Another disadvantage demonstrated by known texturing devices consists in the fact that the yarn therein is generally made to follow a winding path with a large number of acute drive angles, wherein the yarn is stressed due to the high tensions whereto it is subjected, involving a risk of breakage or damage of the yarn itself.

**[0014]** In view of above mentioned disadvantages arising from a texturing machine of known type referring in particular to the machines of that second type like those disclosed in EP-A-0419815, the object of the present invention is to provide a texturing machine, of

that second type of machines which has limited overall dimensions and improved accessibility of the working components.

[0015] Another object of the present invention is that of providing a texturing machine wherein the number of acute angles which the yarn has to perform are reduced to a minimum so as to lower the risk of breakage or damage of the yarn itself.

[0016] The previous objects are achieved essentially with a texturing machine as claimed in claim 1. It comprises a main support framework defining a creel for the support of the feed reels of the yarn to be processed and a support structure for collection assemblies for the textured yarn, wherein said creel and said structure for supporting the yarn collection assemblies are opposite to and distanced one from the other to define an intermediate transit corridor, said texturing machine also comprising, supported by said frameworks, yarn texturing means of the type comprising, in sequence, a part for drawing the yarn to be textured coming from the creel area, a texturing oven for heating said yarn, a channel for cooling the heated yarn exiting said texturing oven, a texturing spindle suitable for causing the required twisting and untwisting of the yarn, and a part for drawing said textured yarn, and is characterised in that said yarn texturing means are arranged alongside said creel on the side of the latter which faces the structure for supporting the collection assemblies.

[0017] In this way the texturing machine according to the invention provides access for an operator, who is in said intermediate corridor, to all the components which make up said texturing means, allowing him to work comfortably without wasting time and avoiding the aforementioned risk situations.

[0018] Moreover according to the invention provision is made for arranging the abovementioned elements defining said texturing means substantially aligned one with the other to define a substantially rectilinear path of the yarn; this allows most of the acute drive angles which are instead to be found in traditional texturing machines to be eliminated and the risk of breakage or damage of the yarn itself to be avoided.

[0019] Further features and advantages of the present invention will in any case be made clearer on reading the following description relating to a particular embodiment of the invention. This description is to be read with reference to the single accompanying figure which shows a side view of the preferred embodiment of the texturing machine according to the present invention.

[0020] The preferred embodiment of the texturing machine shown in the accompanying drawing comprises a main support structure 10 defining a creel 12 for supporting feed reels of the yarn to be processed 14 and a support structure 16 for textured yarn collection assemblies 18. Said creel 12 and said structure 16 for supporting the yarn collection assemblies 18 are opposite to and distanced one from the other so as to leave an in-

termediate transit corridor 20 for staff.

[0021] The texturing machine also comprises yarn texturing means 22 which comprise, in the following order, a part for drawing the yarn to be textured 24 in the form of opposite rotating shafts or rollers, a texturing oven 26 for heating said yarn, said oven 26 having to be opened by the operator to allow the yarn to pass through before the machine is started up, a channel 28 for cooling the heated yarn which comes out of said texturing oven, a texturing spindle for the required twisting and untwisting of the softened yarn and a part 32 for drawing the textured yarn consisting of opposite shafts or rollers.

[0022] As is known, the drawing part 32 draws the yarn at a speed greater than that of said drawing part 24 as, during the texturing operation, the yarn is also stretched, which subjects the same yarn to a situation of stress which, where there are acute drive angles, could cause it to break.

[0023] According to the invention, the abovementioned texturing elements are arranged substantially aligned one with the other to define a substantially rectilinear path of the yarn and to avoid the risks of breakages of the yarn itself. According to the invention the said texturing elements are also attached, independently one from the other, to said main framework, in a lateral position in relation to the creel on the side of the latter which faces the structure for supporting the collection assemblies, which allows easy access to all the components by the operator who can remain virtually at a standstill in the same position inside the transit corridors.

[0024] According to a further innovative feature of the texturing machine of the present invention the texturing means are fed with yarn which comes from below said creel, so that said components of the texturing means can be arranged, according to the sequence listed previously, from the bottom upwards with the yarn in output from said means which passes above said corridor so as not to obstruct the passage of the operator and possible mechanical vehicles.

[0025] Advantageously said aligned texturing means are then attached to said creel and arranged along a substantially vertical line. This allows the width of the transit corridor to be limited to the required minimum for the movement of the operator. According to the invention it can however be foreseen to arrange the substantially aligned texturing means at a slant in relation to the vertical plane with a small angle, no larger in any case than 15° as it is considered that with greater angles, in order to allow easy transit of the operator, the intermediate corridor has to be widened excessively thus making the texturing machine too bulky in terms of width.

[0026] The accompanying drawing shows, in series with said texturing means, the presence of said stabilisation means 33 comprising a second oven 34 for stabilising elasticity of the yarn and a part 36 for drawing the yarn coming out of said second oven 34, in the form of opposite shafts or rollers as for the previously men-

tioned drawing parts.

[0027] Advantageously according to the invention, said fixing oven 34 attached at one end in a cantilevered manner to the support framework 10, is arranged above said intermediate transit corridor 20 between said creel 12 and said structure 16 for supporting said collection assemblies 18. In this way the operator can easily reach said oven 34 for performing the operations required such as opening the oven for the yarn to pass through or assembling or disassembling the same oven always remaining inside said intermediate corridor 20.

[0028] As is clear from the figure, said fixing oven 34 is also arranged tilting downwards with said drawing part 36 which is attached to said support framework 10 above said yarn collection assemblies, in a lower position in relation to said part for drawing the textured yarn 32, in such a way as to make the angle of drive of said drawing parts 36 towards said collection assemblies 18 obtuse. This prevents the yarn from being excessively stressed as, on coming out of the second oven 34, it is still hot and weakened as regards mechanical strength properties.

[0029] In order to guarantee easy access also to said drawing parts 36, the latter are attached onto said support framework on the side of said structure 16 for supporting the collection assemblies 18 which faces said creel 12.

Advantageously, for feeding from below the yarn coming from the creel 12 to said texturing means 22, a yarn transport channel 38 is also provided and attached below the creel 12 to extend from a central position of the creel with a substantially horizontal branch 40 towards the intermediate corridor 20.

[0030] It is clear that, according to the present invention, the path of the yarn inside the working means of the texturing machine does not have virtually any acute drive angles, the only acute angle in the path of the yarn being provided at said textured yarn drawing parts 32 in a situation wherein the yarn can be placed over the driving roller, which has a considerable bending radius which does not in any way cause acute bending of the yarn, and can be simply and conveniently accompanied by the latter to be arranged along another angle without being subjected to those stresses which occur however at acute drive angles. Thus the number of occasions of stress to which the yarn is subjected is reduced in relation however to the situation in traditional texturing machines, lowering the risk of breakages or damage of the yarn which involve the loss of quality and the depreciation of the yarn. A considerable reduction is also achieved in the number of reknottng operations on the broken yarn to be performed by operators in order to restore functioning of the machine, thus with a saving in labour costs.

[0031] It is understood that what has been written and shown in the accompanying drawing with reference to the preferred embodiment of the texturing machine of the present invention has been given purely by way of

a non-limiting example of the inventive principle claimed.

## 5 Claims

1. Texturing machine comprising a main support framework (10) defining a creel (12) for the support of feed reels (14) of the yarn to be processed and a support structure (16) for at least an assembly (18) for collecting the textured yarn, wherein said creel (12) and said structure (16) for supporting the yarn collection assembly (18) are opposite to and distanced one from the other to define an intermediate transit corridor (20), said texturing machine also comprising, supported by said framework (10), yarn texturing means of (22) the type comprising, a part (24) for drawing the yarn to be textured coming from the creel area, a texturing oven (26) for heating said yarn, a channel (28) for cooling the heated yarn coming from said texturing oven (26), a texturing spindle (30) suitable for causing the required twisting and untwisting of the yarn, and a part (32) for drawing the textured yarn, the elements forming said yarn texturing means (22) being arranged substantially aligned one with the other in order to define for the yarn a path substantially rectilinear and vertical or tilted to the vertical plane at an angle not greater than 15° and being arranged alongside said creel (12), on the side of the latter facing the structure (16) for supporting the collection assembly (18), and wherein are provided, in series with said texturing means (22), stabilisation means (33) comprising at least a second oven (34) for heating the yarn and a part (36) for drawing the yarn coming out of said stabilisation oven (34), characterized in that said stabilisation oven (34) is arranged above said transit corridor (20), between said creel (12) and said structure (16) for supporting the collection assembly (18).
2. A texturing machine according to claim 1, wherein said part for drawing the yarn to be textured is attached to a lower area of said creel (12) and wherein the yarn to be textured is fed to said texturing means (22) from below said creel (12), characterized in that a channel (38) for the transport of the yarn is provided from the area of the creel (12) to said texturing means (22), attached to said creel (12) and having at least one branch (40) which develops below said creel (12).
3. A texturing machine according to claim 1, characterized in that said part (36) for drawing the stabilised yarn is arranged at the side of said structure (16) for supporting the collection assembly (18) which faces said creel (12).

4. A texturing machine according to the claim 3, characterized in that said yarn stabilisation oven (34) is arranged tilting downwards in relation to the horizontal plane, and in that said part (36) for drawing the stabilised yarn is attached to said support framework (16) above said yarn collection assembly (18) in a lower position in relation to said part (32) for drawing the textured yarn.

#### Patentansprüche

1. Eine Texturiermaschine, die ein Haupttraggestell (10) umfaßt, das einen Spulenständer (12) für die Halterung von Speisespulen (14) des zu verarbeitenden Garns bildet, sowie eine Tragstruktur (16) für mindestens eine Gruppe (18) für die Sammlung des texturierten Garns, wobei der besagte Spulenständer (12) und die besagte Struktur (16) für die Halterung der Garnsammelgruppe (18) jeweils einander gegenüber und voneinander entfernt liegen, um einen dazwischen befindlichen Durchgangskorridor (20) zu bilden, wobei diese Texturiermaschine ebenfalls durch das besagte Gestell (10) gehaltene Garntexturierelemente (22) umfaßt, und zwar des Typs, der ein Element (24) zum Ziehen des zu texturierenden Garns vom Spulenständerbereich umfaßt, einen Texturierofen (26) für die Erhitzung des besagten Garns, einen Kanal (28) für die Abkühlung des erhitzten, vom besagten Texturierofen (26) kommenden Garns, eine Texturierspindel (30), die für die Verursachung der erforderlichen Zwimung und Entzwimung bestimmt ist, und ein Element (32) zum Ziehen des texturierten Garns, wobei die Elemente, die die besagten Garntexturiermittel (22) bilden, im wesentlichen miteinander ausgerichtet angeordnet sind, um für das Garn eine im wesentlichen geradlinige und senkrechte oder zu der senkrechten Fläche geneigte Bahn zu bilden, und zwar in einem Winkel, der 15° nicht überschreitet, und längsseits zu besagtem Spulenständer (12), an der Seite des letzteren, die der Struktur (16) gegenüberliegt, welche die Sammelgruppe (18) trägt, und wobei in der Reihe mit besagten Texturierelementen (22) Stabilisiererelemente (33) vorgesehen sind, die mindestens einen zweiten Ofen (34) für die Erhitzung des Garns und ein Element (36) zum Ziehen des aus dem besagten Stabilisierofen (34) kommenden Garns umfassen, dadurch gekennzeichnet, daß der besagte Stabilisierofen (34) oberhalb des besagten Durchgangskorridors (20) angeordnet ist, und zwar zwischen dem besagten Spulenständer (12) und der besagten Struktur (16), die die Sammelgruppe (18) trägt.
2. Eine Texturiermaschine gemäß Anspruch 1, wobei das besagte Element zum Ziehen des zu texturierenden Garns an einem unteren Bereich des besag-

ten Spulenständers (12) befestigt ist, und wobei das zu texturierende Garn, das von einem Bereich unterhalb des besagten Spulenständers (12) kommt, zu den besagten Texturierelementen (22) befördert wird, dadurch gekennzeichnet, daß ein Kanal (39) für die Beförderung des Garns vom Bereich des Spulenständers (12) zu den besagten Texturierelementen (22) vorgesehen ist, der an dem besagten Spulenständer (12) befestigt ist und mindestens eine Abzweigung (40) aufweist, der sich unterhalb des besagten Spulenständers (12) erstreckt.

3. Eine Texturiermaschine gemäß Anspruch 1, dadurch gekennzeichnet, daß das besagte Element (36) zum Ziehen des stabilisierten Garns seitlich an der besagten Struktur (16) angeordnet ist, um die Sammelgruppe (18) zu halten, die dem besagten Spulenständer (12) gegenüberliegt.
4. Eine Texturiermaschine gemäß Anspruch 3, dadurch gekennzeichnet, daß der besagte Garnstabilisierofen (34) im Verhältnis zu der waagerechten Fläche nach unten geneigt angeordnet ist, sowie dadurch, daß das besagte Element (36) zum Ziehen des stabilisierten Garns an dem besagten Traggestell (16) oberhalb der besagten Sammelgruppe (18) in einer niedrigeren Stellung in Bezug auf das besagte Element (32) zum Ziehen des texturierten Garns angeordnet ist.

#### Revendications

1. Machine de texturation comprenant un bâti de support principal (10) qui définit un cantre (12) pour le support des bobines d'alimentation (14) du fil devant être traité et une structure de support (16) pour au moins un groupe (18) de ramassage du fil texturé, où ledit cantre (12) et ladite structure (16) de support du groupe de ramassage du fil (18) sont opposés et écartés l'un de l'autre pour définir un couloir intermédiaire de transit (20), ladite machine de texturation comprend également, supporté par ledit bâti (10), des moyens de texturation du fil (22) du type comprenant une partie (24) pour éliner le fil à texturer venant de l'aire du cantre, un four de texturation (26) pour chauffer ce fil, une gorge (28) de refroidissement du fil chauffé venant dudit four de texturation (26), une broche de texturation (30) adaptée pour provoquer la torsion et le décordage requis du fil, et une partie (32) pour étirer le fil texturé, les éléments formant ces moyens de texturation du fil (22) étant disposés essentiellement alignés l'un par rapport à l'autre de manière à définir pour le fil un chemin essentiellement rectiligne et vertical ou incliné par rapport au plan vertical d'un angle non supérieur à 15° et disposé le long dudit cantre (12), sur le côté de ce dernier face à la struc-

ture (16) pour supporter le groupe de ramassage (18), et où sont prévus, en série avec lesdits moyens de texturation (22), des moyens de stabilisation (33) comprenant au moins un second four (34) pour chauffer le fil et une partie (36) pour étirer le fil sortant dudit four de stabilisation (34), caractérisé par le fait que ledit four de stabilisation (34) est mis en place au-dessus dudit couloir de transit (20) entre ledit cantre (12) et ladite structure (16) de support du groupe de ramassage (18).

2. Une machine de texturation conformément à la revendication 1, où ladite partie pour étirer le fil à texturer est attachée à l'aire inférieure dudit cantre (12) et où le fil à texturer alimentant lesdits moyens de texturation (22) vient de sous ledit cantre (12), caractérisé par le fait qu'une gorge (38) de transport du fil est prévue venant de l'aire du cantre (12) vers ces moyens de texturation (22), attachés audit cantre (12) et ayant au moins une branche (40) qui se développe sous ledit cantre (12).
3. Une machine de texturation conformément à la revendication 1, caractérisée par le fait que ladite partie (36) pour étirer le fil stabilisé est disposée sur le côté de ladite structure (16) de support du groupe de ramassage (18) qui fait face audit cantre (12).
4. Une machine de texturation conformément à la revendication 3, caractérisée par le fait que ledit four de stabilisation du fil (34) est disposé d'une manière inclinée vers le bas par rapport au plan horizontal, et par le fait que ladite partie (36) d'étirage du fil stabilisé est attachée audit bâti de support (16) au-dessus dudit groupe de ramassage du fil (18) dans une position inférieure par rapport à ladite partie (32) d'étirage du fil texturé.

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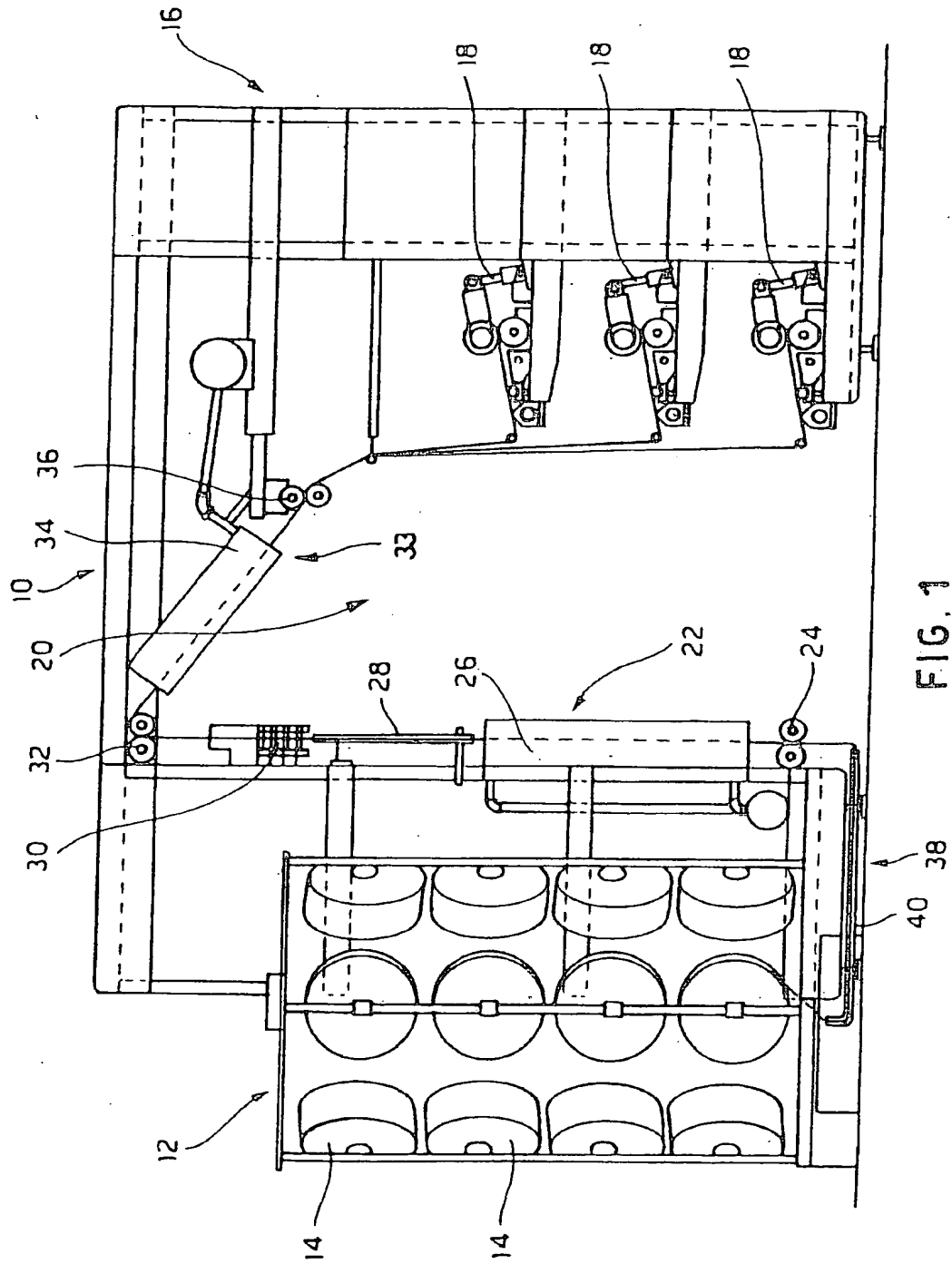


FIG. 1